

CLAIMS

What we claim is:

1. A process of preparing a canola protein isolate, which comprises:
  - (a) extracting a canola oil seed meal to cause solubilization of protein in said canola oil seed meal and to form an aqueous protein solution having a protein content of about 5 to about 40 g/L and a pH of about 5 to about 6.8;
  - (b) separating the aqueous protein solution from the residual canola oil seed meal,
  - (c) increasing the protein concentration of said aqueous protein solution to at least about 50 g/L while maintaining the ionic strength substantially constant by using a selective membrane technique to provide a concentrated protein solution; and
  - (d) drying the concentrated protein solution to provide a canola protein isolate having a protein content of at least about 90 wt% (N x 6.25) on a dry weight basis.
2. The process of claim 1 wherein said canola protein isolate has a protein content of at least about 100 wt% (N x 6.25) d.h.
3. The process of claim 1 wherein said canola protein isolate has a canola protein profile which is about 25 to about 55 wt% of 2S canola protein, about 45 to about 75 wt% of 7S canola protein and about 0 to about 15 wt% of 12S canola protein.
4. The process of claim 2 wherein said canola protein isolate has a canola protein profile of about 40 to about 50 wt% of 2S canola protein, about 50 to about 60 wt% of 7S canola protein and about 1 to about 5 wt% of 12S canola protein.
5. The process of claim 1 which is carried out in a batch mode and wherein said extracting of said canola oil seed meal is effected by using an aqueous salt solution having an ionic strength of at least about 0.05 and a pH of about 5 to about 6.8 at a temperature of at least about 5°C.
6. The process of claim 5 wherein said salt solution has an ionic strength of about 0.1 to about 0.6.
7. The process of claim 5 wherein said salt solution has a pH of about 5.3 to about 6.2.
8. The process of claim 5 wherein said extracting of said canola oil seed meal is effected with agitation of the aqueous salt solution for about 10 to about 30 minutes.

9. The process of claim 8 wherein the concentration of canola oil seed meal in said aqueous salt solution during the extraction step is about 5 to about 15 wt%.
10. The process of claim 5 wherein said protein solution resulting from the extraction step has a protein concentration of about 10 to about 30 g/L.
11. The process of claim 5 wherein said aqueous salt solution contains an antioxidant.
12. The process of claim 1 which is carried out on a continuous basis and wherein said extraction step is effected by:
  - (i) continuously mixing said canola oil seed meal with an aqueous salt solution having an ionic strength of at least about 0.5 and a pH of about 5 to about 6.8 at a temperature of about 5° to about 65°C, and
  - (ii) continuously conveying said mixture through a pipe while extracting protein from the canola oil seed meal to form an aqueous protein solution having a protein content of about 5 to about 40 g/L in a period of time up to about 10 minutes.
13. The process of claim 12 wherein said salt solution has an ionic strength of about 0.1 to about 0.8.
14. The process of claim 12 wherein the salt solution has a pH of about 5.3 to about 6.2.
15. The process of claim 12 wherein the concentration of oil seed meal in said aqueous salt solution in said mixing step is about 5 to about 15% w/v.
16. The process of claim 12 wherein said temperature is at least about 35°C.
17. The process of claim 12 wherein said aqueous protein solution has a protein content of about 10 to about 30 g/L.
18. The process of claim 12 wherein said aqueous salt solution contains an antioxidant.
19. The process of claim 1 wherein following said separating of the aqueous protein solution from the residual canola seed meal, the aqueous protein solution is subjected to a pigment removal step.
20. The process of claim 19 wherein said pigment removal step is effected by diafiltration of the aqueous protein solution.

21. The process of claim 19 wherein said pigment removal step is effected by mixing a pigment adsorbing agent with the aqueous protein solution and subsequently removing the pigment adsorbing agent from the aqueous protein solution.
22. The process of claim 21 wherein the pigment adsorbing agent is powdered activated carbon.
23. The process of claim 1 wherein said oil seed meal is extracted with water and subsequent thereto salt is added to the resulting aqueous protein solution to provide an aqueous protein solution having an ionic strength of at least about 0.05.
24. The process of claim 1 wherein said concentration step is effected by ultrafiltration to produce a concentrated protein solution having a protein content of at least about 200 g/L.
25. The process of claim 1 wherein said concentrated protein solution is subjected to diafiltration using an aqueous salt solution having the same ionic strength used in the extraction step.
26. The process of claim 25 wherein said diafiltration is effected using about 2 to about 20 volumes of diafiltration solution.
27. The process of claim 26 wherein said diafiltration is effected using about 5 to about 10 volumes of diafiltration solution.
28. The process of claim 25 wherein said at least part of the diafiltration step is effected in the presence of an antioxidant.
29. The process of claim 1 wherein said concentrated protein solution is subjected to a colour removal step.
30. The process of claim 29 wherein said colour removal step is effected using granulated activated carbon or polyvinylpyrrolidone.
31. The process of claim 1 wherein said concentrated protein solution is subjected to a pasteurization step.
32. The process of claim 31 wherein the pasteurization step is effected by heating the concentrated protein solution to a temperature of about 55° to about 70°C for about 10 to about 15 minutes.
33. The process of claim 1 including formulating the dried canola protein isolate as a feed composition for use in aquaculture.

34. The process of claim 33 wherein said feed composition is formulated for feeding salmonids.

35. A feed composition for aquaculture comprising a canola protein isolate produced by the method of claim 1.

36. The feed composition of claim 35 wherein said feed composition is formulated for feeding salmonids.

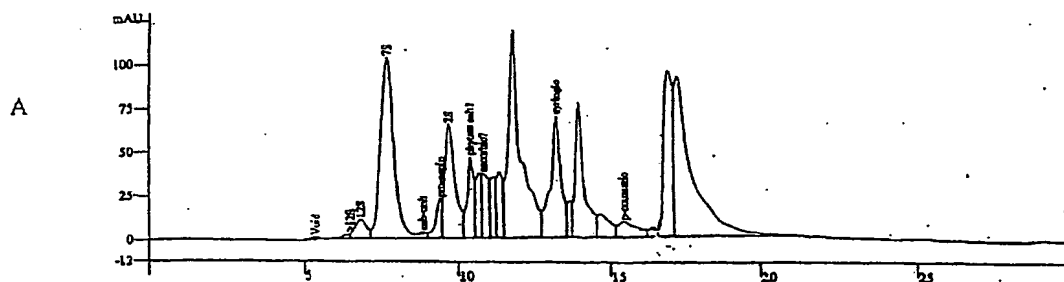
37. A feed composition for aquaculture comprising a canola protein isolate having a protein content of at least about 90 wt% and having a canola protein profile which is about 25 to about 55 wt% of 2S canola protein, about 45 to about 75 wt% of 7S canola protein and about 0 to about 15 wt% of 12S canola protein.

38. The feed composition of claim 37 wherein said canola protein solution has a protein content of at least about 100 wt% and having a canola protein profile which is about 40 to about 50 wt% of 2S canola protein, about 50 to about 60 wt% of 7S canola protein and about 1 to about 5 wt% of 12S canola protein.

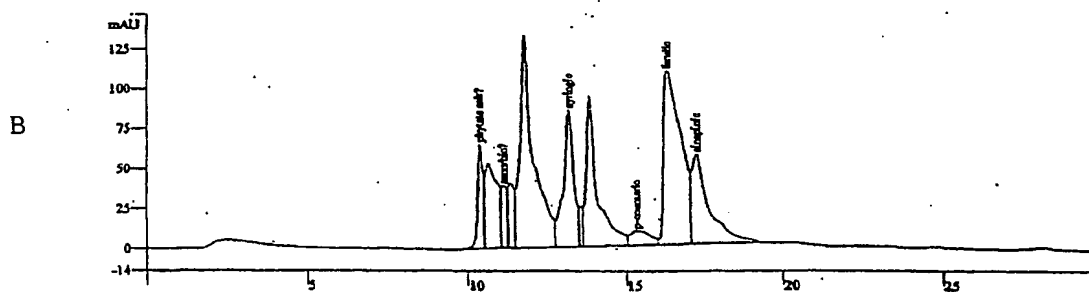
39. The feed composition of claim 37 which is formulated for feeding salmonids.

**FIGURE 1: Bench Study HPLC-SEC Chromatograms**

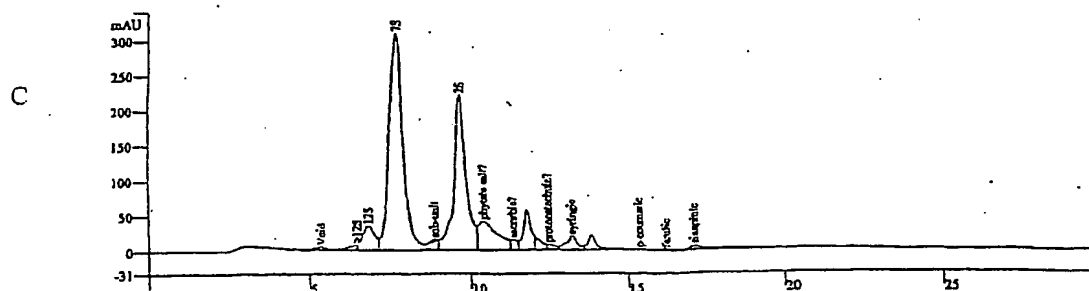
Bench Extract December 11, 2003: SEC-HPLC chromatogram 1:4 dil. 50-uL injection.



Bench DF Permeate December 12, 2003: SEC-HPLC chromatogram no dil. 50-uL injection.



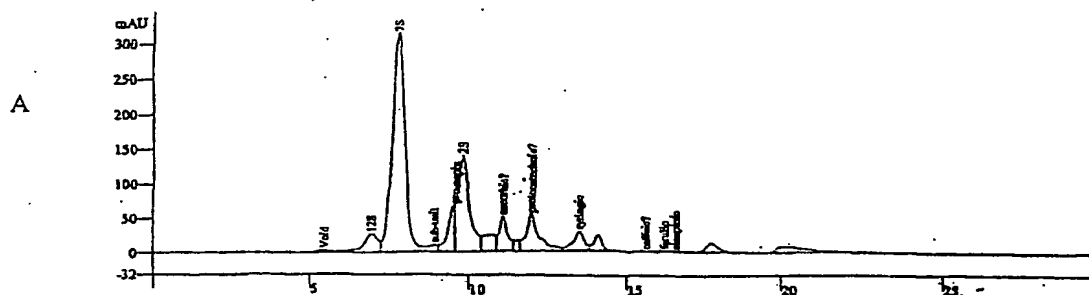
Bench DF UF Dialyzed Isolate December 17, 2003: SEC-HPLC chromatogram 1% 50-uL injection.



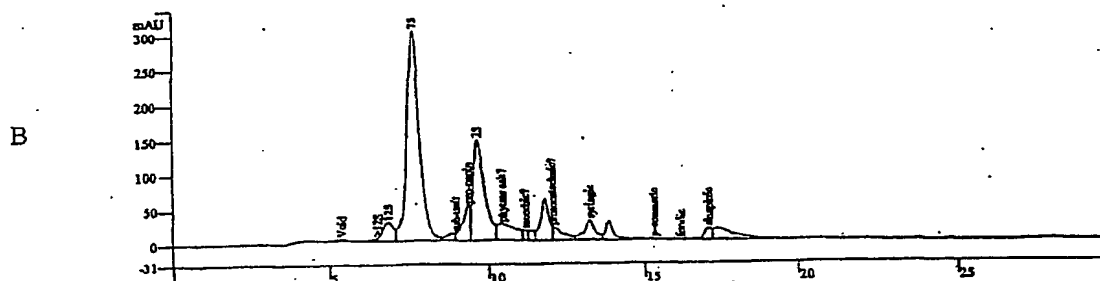
2/2

**FIGURE 2: BW-AL022-102-03A #1 C500 HPLC-SEC Chromatograms**

102 Isolate September 19, 2003: SEC-HPLC chromatogram 1% 50-uL injection



102 Isolate December 18, 2003: SEC-HPLC chromatogram 1% 50-uL injection



All samples prepared with 0.10M NaCl.